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OXC-1026

24 October 1960

PURPOSE AND DESCRIPTION OF LOCAL FLIGHT TEST PROGRAM

The chief purpose of local flight testing is to subject the system to as near a realistic flight environment as possible with the capability of having engineers observe the system during operation. These flight tests logically will follow laboratory testing of the system. System performance will be measured under operating conditions unattainable in the laboratory. A typical example is the effect of vibration on image quality; any vibration induced in the system during laboratory evaluation is likely to effect the artificial scene, making evaluation impossible. However, during flight testing the scene does not vibrate. Likewise, system performance from a real V/H input can be determined, including the effect of cloud cover; system stabilization performance can be better evaluated; the capability of controlling the system center of gravity can be determined in a realistic manner; perhaps exposure programming and V/H programming can be evaluated; and some practical aspects of ground handling, pre- and post-flight procedures can be determined.

The flight test objectives can best be achieved under operating conditions allowing the presence of personnel to make observations and operate various instruments which monitor system operation. The capability to make system adjustments during operation allows the testing of several variables during one flight and allows in many instances for the correction or improvement of system operation during flight. The performance of these test functions during flight will optimally utilize testing time and expenditures.

It is difficult to determine in advance the test objectives of each flight because these are dictated by results obtained from previous flights. During the first flight V/H will be maintained as constant as possible by flying over relatively flat terrain and system vibrations will be measured and its effect determined. During following flights, the performance of system stabilization and pointing, system reaction to V/H sensing and exposure programming, V/H sensor reaction to cloud cover and other operating factors will be determined and adjustments made for optimum system performance.

It is estimated that approximately eleven flights are required. It is of utmost importance that all data obtained from a given flight be completely reduced and evaluated prior to the next flight. Therefore, the estimated flight frequency is one flight per week for the first five weeks, followed by two flights per week for the remaining three weeks.

AIRCRAFT SELECTION

The selection of a C-119 aircraft for flight testing was based on the following requirements:

1. V/H rate of 0.035/sec. at an altitude of at least 7500 feet.

2. Vehicle construction to allow adequate seeing through the bottom of the hull.

3. Vehicle size to allow access to any part of the system while installed.

4. Sufficient space to house flight test equipment (recorders, oscilloscopes, etc.), and [redacted] flight test personnel. 25X1A

C-119 DESCRIPTION

1. V/H capability: The cruise speed of 175 knots is sufficient to give the proper V/H rate. (Commercially available C-82 aircraft have a lower cruise speed.) The altitude of 7500 feet is the minimum that will allow the terrain in the North-East United States to remain in focus through most of the scan-angle. At this altitude images between the scan-angles of [redacted] will be in focus. This can be seen in Figure 1. 25X1A 25X1A

2. Installation and seeing: All C-119 aircraft with serial numbers after AF 49-101 and Navy 124324 have aerial delivery doors in the floor. The clear aperture of this door is 70" x 50" which allows the system to be fitted flush with the skin line. Installation in this manner provides hemispherical seeing capability for the system.

3. System accessibility: The location of the delivery door is such that a minimum of three feet clearance is provided to all parts of the system.

4. The total floor area of the aircraft is approximately 250 square feet. This provides ample space for personnel and test equipment.

COST

The cost for a bailed C-119 for 100 hours of flight time

25X1A

25X1A is [redacted] These costs will be paid to the [redacted] 25X1A
[redacted] for maintenance and flight of the aircraft as well as ground laboratory facilities.

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